PHYSICO- CHEMICAL CHARACTERISTICS OF SARYU RIVER, U.P., INDIA

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ABSTRACT

The present paper deals with the observation on physico-chemical characteristics of river Saryu that was found polluted by various sources of pollution. River Saryu is regarded as fresh perennial water body which was observed regularly polluted by discharge of different physical and chemical pollutants released from various small scale industries like rice mills, petroleum workshops, railway workshops, dairy, laundries and cereal market. Pollutants discharged from these sources were found resulting into deterioration of water quality and disturbing the aquatic ecological balance of river Saryu.

INTRODUCTION

Water being a universal solvent has been and is being utilized by mankind. Of the total amount of global water, only 2.4% is distributed on the main land, of which only a small portion can be utilized as fresh water. The available fresh water to man is hardly 0.3-0.5% of the total water available on the earth and therefore, its judicious use is imperative (Ganesh & Kale, 1995). The fresh water is a finite and limited resource (Bower, 2000). The utilization of water from ages has led to its over exploitation coupled with the growing population along with improved standards of living as a consequence of technological innovations (Todd, 1995 and Raj, 2000). This contamination of river water body is not away from the evils of modernization.

In Uttar Pradesh the twin cities Ayodhya and Faizabad are famous lor their historical background. A fresh perennial water body known as Saryu

River is running along both the cities. River Saryu is well known as a major source of water required for various purposes of domestic, agricultural and commercial utilization. On the entrance, this water body gets contaminated by the wastes discharged from different small-scale industries like rice mills, petroleum workshops, railway workshops, dairy, laundries and cereal market. Garbage from domestic sources, hospitals and pathological labs were also found discharged into river Saryu. Over all these municipal wastes are responsible for the deterioration of water quality of river Saryu.

The present study deals with pysico-chemical characteristics of river water quality of Saryu contaminated by different types of municipal wastes.

MATERIALS AND METHODS

Municipal wastcwater samples were collected from five prefixed sampling sites on the major drains (viz. Dl, D2, D3, D4 and D5) of city. The samples were brought to laboratory and analyzed for the selected parameters using the standards methods (Trivedi and Goel, 1984; APHA, 1992) while pH and Dissolved Oxygen (DO) were measured on the spot of collection of samples. The other parameters were analyzed in the laboratory within twenty-four hours.
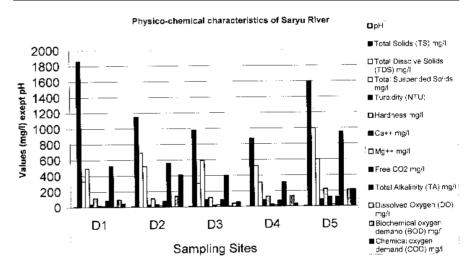
RESULT AND DISCUSSION

The values of selected physico-chemical parameters of river Saryu at selected sites viz. Dl, D2, D3, D4 and D5 have been shown in Table 1.

Table 1 reveals that the water was found alkaline as pH values fluctuates between 7.5-7.7 excluding the site D5 that was recorded 6.0. This fluctuation seems to be due to dilution of industrial and sewage effluents in rainy season. Increased pH surface water is obliviously related to metabolic activities of autotrophs, which by utilizaing CO_2 during photosynthesis reduces hydrogen ion concentration. The similar observation was reported by Gupta and Sharma (1994), Singh (1996), Chandra and Sharma (2000). Some other parameters like hardness vs. total dissolve solids (TDS) and turbidity vs total suspended solids (TSS) showed little relation among them. It is provably due to heavy burden of over population, increased sewage disposal and other human activities like washing, bathing, throwing of dead bodies and carcasses. Dissolve Oxygen (DO) was found from 2.07-6.60 mg/L, however, BOD values were recorded from 44.5-214.6 mg/L. The low values of DO might be due to higher growth of bacteria, which utilize oxygen for their metabolic activities as reported by Roy *et al.* (1984), Badge and Vcrma (1985). The maximum chemical oxygen demand (COD) value of 452 mg/L was observed at Dl. COD values have been found to be much higher than BOD values which were due to presence of chemically oxidisable carbonaceous matter as well as inorganic matters like nitrates, sulphides and reduced metal ions coming from industrial effluents, washing, bathing (detergents and soap) and other activities. Rana, 1997; Prasad and Saxcna, 1980 and Gunalc, 1991, have reported the same observations. It would be apparent from an examination of Table 1, that water quality of river Saryu has undergone a remarkable change, which may directly be attributed

Table 1
Physico-chemical characteristics of Saryu River

Parameters	Sampling Sites				
	Dl	D2	D3	D4	D5
pH	7.7	7.8	7.6	7.5	6.0
Total Solids, mg/L	1860	1150	980	870	1600
Total Dissolve Solids, mg/L	332	690	300	520	1998
Total Suspended Solids mg/L	494	520	590	310	602
Turbidity (NTU)	35	29	91	82	88
Hardness mg/L	115	110	120	730	224
Ca^Hmg/L	19.21	35.07	21.07	29.66	120.24
$Mg^\wedge$mg/L	15.32	19.48	2485	17.54	25.32
Free CO_2 mg/L	86	76	91.4	73.7	118
Total Alkalinity, mg/L	524	560	400	310	950
Dissolved Oxygen,mg/L	4.06	2.07	6.6	4.08	5
BOD, mg/L	96	140	44.5	133.12	2146
COD, mg/L	45.2	412	59.2	36.2	216

to increase in industrial units and population of the cities (Ayodhya and Faizabad). Increased human interferences may be caused deterioration of water quality of river Saryu.

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